Sempervirens
Summer 2024 The Quarterly of the Virginia Native Plant Society

VNPSers paddle Dragon Run's plant paradise

This colorful VNPS group, under the guidance of Kevin Howe, explored Dragon Run by kayak on May 8. (Kevin Howe and Friends of Dragon Run photos)

On May 8 and May 15, I led 19 VNPS members from many chapters across the state on a kayak tour along a three-mile section of Dragon Run, a Bald Cypress Tupelo Swamp Community.

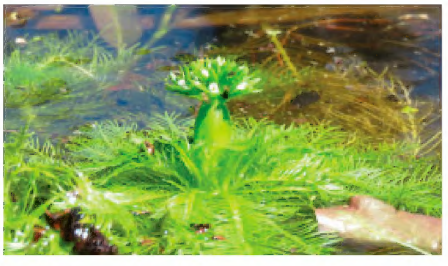
Dragon Run is a 14-mile-long swamp system between Middlesex and King and Queen counties on the Coastal Plain. It is largely unchanged from when John Smith explored it in the early 1600s.

This pristine blackwater stream system was identified by Smithsonian Institution ecologists in 1973 as the second most pristine watershed in the Chesapeake Bay region and the most pristine in Virginia. Thanks to The Nature Conservancy, Friends of Dragon Run, Virginia Outdoors Foundation and others, about 25% of its 140 square mile watershed is protected in some manner for its conservation values. The trip was organized by Friends of Dragon Run, a non-profit conservation group dedicated to the preservation and protection of this special ecological community. The trip included close up views and anecdotes about rare or unusual flora and fauna that occur in this remarkable Bald Cypress swamp. To read more about Dragon Swamp and find out how to sign up for a non-VNPS Paddle Trip and/or hike check out https://www.dragonrun.org/

Another VNPS kayak trip is planned for the fall (October) when the season is changing and birds are migrating – a fine time to see the coastal fall including the VNPS Wildflower of the year, White Turtlehead (*Chelone glabra*), growing along Dragon Run. Watch for an email announcement about this colorful fall trip.

Other state-wide trips are in the planning – watch your VNPS email for announcements.

--Kevin Howe, 1st VNPS Vice President



Featherfoil, *Holtonia inflata*

Fetterbush, *Eubotrys racemose*

Virginia Sweetspire, *Itea virginica*

Turtleheads, Iridoids, and Checkerspots

Article by W. John Hayden, Botany Chair

Have you ever noticed how many good stories involve some sort of triangle? This article follows the story of how a plant, a molecule, and an herbivore interact with each other. The plant, of course, is White Turtlehead (*Chelone glabra*), the 2024 VNPS Wildflower of the Year; the molecule is something called an iridoid glycoside; and the herbivore is the Baltimore Checkerspot Butterfly (*Euphydras phaeton*). At the most basic level, the three-way interaction between these elements is simple: White Turtlehead makes iridoid glycosides to protect itself from being eaten, but despite presence of these chemicals, Baltimore Checkerspots use White Turtleheads as their primary larval food source.

White Turtlehead (Figure 1) is a perennial herbaceous plant with a preference for moist soils; it can be found throughout the eastern deciduous forest of North America. As is the case with many woodland herbs, its leaves are relatively soft and only slightly hairy; there are no obvious structures like spines or thorns that might constitute a physical defense against being eaten. Evidently, Turtleheads depend on chemistry-based protection. The Turtlehead genus, *Chelone*, is classified as a member of Plantaginaceae, the Plantain family.

Iridoid glycosides (Figure 2) are an interesting category of molecules. The "glycoside" portion of the name refers to the fact that the full molecule incorporates one molecule of the simple sugar, glucose, as part of its structure. Explanation of the "iridoid" part of these molecules is a bit more complicated. Iridoids are a subtype of molecules known as monoterpenes, molecules that non-chemists easily recognize by odor or taste. Certainly, a few of the following examples of monoterpenes will be familiar: pinene is the odor of pine and spruce trees; menthol is one of several monoterpenes responsible for the fresh odor and taste of many mints; and limonene provides the fragrance of lemons. Many culinary herbs and spices owe their special properties to the presence of monoterpene molecules. Not all monoterpenes, however, have the pleasant tastes and/or odors of the examples just given. In fact, when the same atoms are arranged in a different way, monoterpenes can be bitter to the taste and that is the case for iridoids. Moreover, like many bitter substances, if consumed in large doses, iridoids can be toxic.

Our third member of this story's triangle is the Baltimore Checkerspot, a member of the Brush-footed Butterflies, family Nymphalidae (Figures 3 and 4). The Baltimore Checkerspot range has much overlap with that of White Turtlehead, but the two ranges are not exactly congruent; this butterfly is largely absent from all but the mountainous regions of Virginia, the Carolinas, Georgia, Alabama and Mississippi whereas White Turtlehead is much more widespread in these states.

In Virginia, Baltimore Checkerspots are found in several counties in

Figure 1. White Turtlehead, *Chelone glabra*; its leaves contain iridoid glycosides that provide protection from many, but not all, potential herbivores. (W. John Hayden)

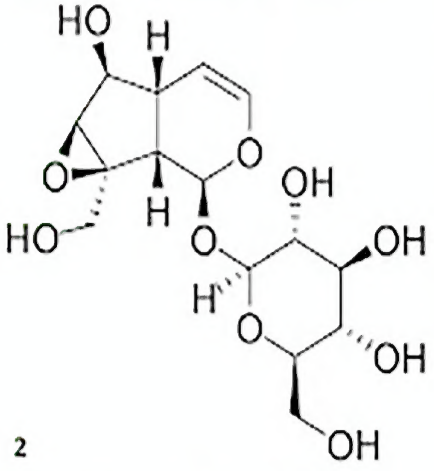


Figure 2. Catalpol, one of the iridoid glycoside molecules present in White Turtlehead; the ring structure to the lower right is glucose, the rest of the molecule is an example of an iridoid monoterpene. (Wikipedia)

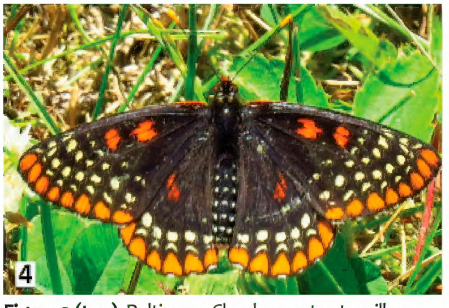


Figure 3 (top). Baltimore Checkerspot caterpillar, *Euphydras phaeton*; despite presence of catalpol, White Turtlehead is its primary food source. (Pennsylvania Department of Conservation and Natural Resources, via Wikipedia)

Figure 4. Adult Baltimore Checkerspot butterfly; catalpol ingested as a larva makes this butterfly distasteful to birds. (D. Gordon and E. Robertson, via Wikipedia)

the extreme southwest portion of the state. Female Baltimore Checkerspots oviposit on the underside of White Turtlehead leaves during summer—because the eggs are laid on Turtlehead, this is the plant that newly hatched caterpillars eat, hence designation of Turtlehead as primary larval host for the Baltimore Checkerspot. Once they hatch, groups of larvae feed from within a nest of silk for protection from predation by birds. As warm weather of summer draws to a close, the caterpillars drop to the ground and hibernate through winter among fallen leaves. In the spring, the caterpillars become active again, and their first task is to locate another food source. Interestingly, the spring-emergent caterpillars do not automatically relocate on White Turtlehead, although some certainly do. Spring-emergent caterpillars will feed on a variety of different hosts, including *Viburnum* spp., *Lonicera* spp. (Honeysuckles), *Aureolaria* spp. (False Foxglove) and *Plantago* spp. (Plantains), among others. Spring-emergent caterpillars feed for a few weeks and then pupate. In the southern part of the range, adult Baltimore Checkerspots emerge in May or June, somewhat later to the north. There is only one brood per year. Ironically, despite being named for the largest urban center in Maryland, the Baltimore Checkerspot is now considered endangered in that state.

For plants, there is never an upside to being eaten. Plants work hard to make sugars via photosynthesis and then use that sugar, along with water and minerals from the soil, to build their own bodies. Leaves, stems, roots, flowers, fruits, and seeds are all made by the plant starting with just sugar, water, and minerals from the soil. When an herbivore eats a leaf, the plant's investment of sugar, water, and minerals is lost to another organism and, minus some portion of its leaves, the plant has less capacity to make more sugar. This is not rocket science, herbivory is bad for plants. Consequently, plants have evolved a wide array of herbivore protection strategies ranging from spines and thorns, tough unpalatable tissues, and synthesis of toxic and/or bad-tasting chemicals. Completely unprotected plants would be gobbled up quickly by hungry animals. Turtleheads, as well as a number of other plants, synthesize iridoid glycoside molecules as their protection from being eaten. Iridoid glycosides just plain taste bad, to humans and perhaps to other animals, too. For a generalist herbivore that is not specially adapted to metabolize iridoids, these molecules will significantly inhibit growth and development. Most herbivores, when taking a sample of an ididoid-containing leaf, will move on to some other plant. In the case of White Turtleheads, a specific type of iridoid glycoside called catalpol is found throughout the plant and this molecule serves as its first line of defense against herbivory; a second iridoid glycoside called aucubin can also be present, but in lesser amounts. Most herbivores, after a bite or two will leave Turtleheads alone.

Figure 5. Narrow-leaf Plantain, *Plantago lanceolata*; a species not native to North America, known to produce catalpol, and capable of supporting caterpillars of the Baltimore Checkerspot. (W. John Hayden)

However, not all herbivorous animals are exactly alike. Taste tolerances and the ability to breakdown and/or sequester toxic molecules varies from one kind of animal to another. Over time, the ability of ancestral Checkerspots to resist the negative effects of the iridoid catalpol opened up an otherwise unexploited food source—Turtleheads became available as a nutritious food source. Moreover, there would be few herbivores competing with Checkerspots because most other herbivores would be deterred by catalpol. So, development of catalpol tolerance was good for Checkerspots, but bad for Turtleheads.

There is another angle to this plant-herbivore interaction: at some point in the past, via adaptive selection for new biochemical capabilities, Checkerspots acquired the capacity to store (sequester) catalpol molecules in their bodies. What this means is that Checkerspot caterpillars, from having consumed Turtlehead leaves, now have enough catalpol to protect both caterpillars and adult butterflies from predation by birds. The situation is essentially like the cardiac glycosides made by milkweeds that protect Monarch Butterflies who ate nothing but milkweeds as caterpillars. It should be no surprise, therefore, that a female Checkerspot preferentially oviposits (lays eggs) on Turtleheads, and her selection of Turtleheads from the bewildering array of diverse plants in a natural habitat is certainly driven by her sensitivity to the chemical signature of the Turtlehead plant.

The story gets more complicated

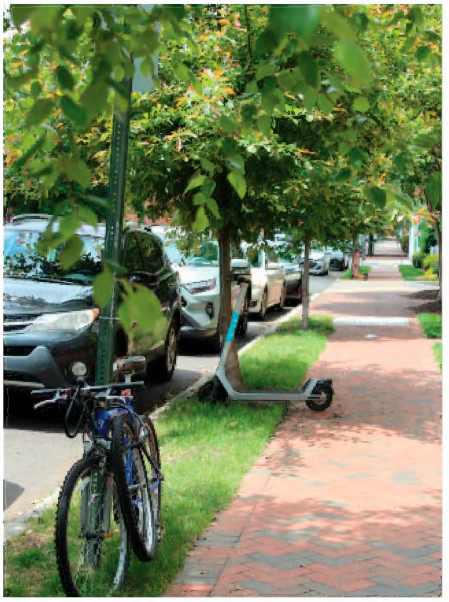
(See Iridoids, page 4)

VCU's Sustainability Team restores green infrastructure

In 2019 and 2020, a pair of studies and a *New York Times* article brought attention to the relationship between historic redlining and urban heat islands in Richmond, Virginia, (Shandas et al., 2019, Hoffman et al., 2020, Plumber et al., 2020). Comparing temperature maps to Richmond neighborhood maps from the 1930s and 40s, redlined neighborhoods, predominantly populated by African-Americans, were shown to suffer intense summer heat, in large part due to the amount of pavement and lack of high-quality green space and tree canopy.

Urban foresters have long recognized the benefits of trees in cities. They cast shade, making streets and sidewalks bearable in the late summer heat. They also retain stormwater and function as a part of a city's green infrastructure, contributing to environmental equity and resiliency in urban areas. Recognizing that the urban canopy in Richmond's historically under-resourced neighborhoods was in need of remediation, the Sustainability Team at Virginia Commonwealth University (VCU) began looking for opportunities to assist in the reforestation of the city. Members of the Carver Area Civic Improvement League (CACIL) were particularly interested in adding trees in their neighborhood. Not only does Carver lack the same canopy coverage

(See VCU, page 5)



Trees and shade in Richmond's Carver neighborhood. (Photos by VCU Sustainability student intern Elsa Hoppe)

Iridoids

(Continued from page 3)

when it comes to Checkerspot caterpillars' choice of secondary plant hosts, i.e., the plants that they eat after their period of winter dormancy. However, iridoid glycosides are known from the secondary hosts listed above (paragraph four). It appears that the same genetic tolerance and biochemical ability to sequester otherwise toxic molecules by Checkerspots applies pretty much the same for primary (Turtlehead) and secondary (diverse plants) food sources. Plantains (genus *Plantago*, family Plantaginaceae) provide a particularly interesting case in point. There are Plantains native to eastern North America, as well as non-native weedy species like Narrow-leaf Plantain (*Plantago lanceolata*) and Broad-leaf Plantain (*Plantago major*)—and all are known to make the iridoid molecules catalpol and aucubin. Consequently, it should be no surprise at all that early spring Checkerspot caterpillars sometimes select Plantains as secondary, post-diapause, food plants.

Stranger still, it has come to light that female Checkerspot butterflies will sometimes oviposit directly on leaves of Narrow-leaf Plantain, *Plantago lanceolata* (Figure 5), a non-native, exceedingly common, weedy species in eastern North America (Arriens et al. 2021, and several sources cited therein). Studies have been conducted comparing the life cycle of Checkerspot caterpillars on native White Turtlehead and non-native Narrow-leaf Plantain. Results found were mixed, by some measures caterpillars that ate White Turtlehead did better, but in other aspects of the life cycle Narrow-leaf Plantain proved the more advantageous food source. In northern portions of its range, large populations of the Baltimore Checkerspot use Narrow-leaf Plantain as their primary food plant. Success of Baltimore Checkerspots reared on Narrow-leaf Plantain has important theoretical and practical consequences. Theoretically, ecologists have the rare opportunity to observe and document the process of a specialist herbivore expanding its host range from White Turtlehead to Narrow-leaf Plantain. And from a practical, pro-conservation perspective, the prospect of Baltimore Checkerspots exploiting abundant populations of this weedy plantain species could bode well for the future of this beautiful and charismatic butterfly. Indeed, Narrow-leaf Plantain is abundant in Maryland and Virginia; perhaps having two primary host plants could help restore Baltimore Checkerspots in Maryland and, further, expand the butterfly's range in the Old Dominion. Time will tell. ❖

LITERATURE CITED

Arriens, J. V., L. M. Brown, and E. E. Crone. 2021. Phenology of feeding preference in post-diapause Baltimore Checkerspot (*Euphydras phaeton*) caterpillars. Ecological Entomology 46: 310-318.

VCU

(Continued from page 4)

as other areas of Richmond, it sits directly north of VCU's Monroe Park Campus in the heart of Richmond (Kane, 2018).

In 2018, VCU Sustainability, in partnership with CACIL, the Richmond Tree Stewards, and the city of Richmond, planted 62 trees in vacant tree wells throughout the Carver neighborhood. The chosen trees came from the city's list of approved trees and the interested parties all made the choice to include as many natives as possible. The cohort includes River Birch (*Betula nigra*), Eastern Redbud (*Cercis canadensis*), Serviceberry (*Amelanchier arborea*), and Yellowwood (*Cladrastis kentukea*).

This past spring, VCU Sustainability returned to the Carver neighborhood to take stock of the trees planted six years ago. Using a variety of tools, we measured tree height, canopy width, and diameter at breast height (DBH) of our street tree cohort. We fed that data into iTree, a program designed to estimate and assign a value to the ecosystem services provided by an individual tree or group of trees. Overall, the 45 remaining trees from the 2018 planting sequester roughly 109 kg of carbon per year and produce close to 290 kg of oxygen over the same time period. The total value of replacement for these trees at their current size is estimated at $11,000.

VCU Sustainability staff, interns, and volunteers also inventoried a group of 120 trees planted three years ago in the Randolph neighborhood at Amelia Street School. Randolph, another neighborhood that was subject to racist redlining policies in the 1930s and 40s, sits just south of VCU's Monroe Park Campus.

The project at Amelia Street School serves many of the same purposes as the Carver street tree project but is broader in its ecological goals. Alleviating the heat island effect and capturing stormwater are still top of mind at Amelia Street, but with the inclusion of native forbs and grasses alongside trees, VCU Sustainability has created a diverse plant community supporting native insect and bird species. What was once an expanse of grass needing to be mowed regularly now includes four distinct plantings, or micro meadows, covering a total of 11,500 square feet.

Solidago rugosa that has been planted in the Amelia Street School meadow.

While the meadow is maintained with shovel and trowel today, many of the species present were selected to mimic a piedmont prairie ecosystem that historically would have been managed with fire set by Native Americans or by lightning strike (Davis, Jr. et al., 2002). Butterfly-weed (*Asclepias tuberosa*), Green-and-Gold (*Chrysogonum virginianum*), Black-eyed Susan (*Rudbeckia hirta*), Wrinkle-leaf Goldenrod (*Solidago rugosa*), and Tall Blazing Star (*Liatris aspera*) are some of the wildflowers mixed in with grasses like Showy Lovegrass (*Eragrostis spectabilis*), Indian Grass (*sorghastrum nutans*), Broomsedge (*Andropogon virginicus*), and both Little and Big Bluestem (*Schizachyrium, Scoparium, Andropogon gerardii*).

As we move forward at VCU, we continue to look for opportunities to incorporate more native plants into our landscape and surrounding communities. Native plants contribute to a more biodiverse campus, and the reduced lawn and increased tree canopy help reduce runoff into the James River. New plantings can serve as educational resources for faculty, students, and community members while making Richmond more environmentally resilient and equitable.

--Richmond native Lloyd Blake has just finished his first year as the Urban Gardens and Forestry Coordinator with VCU Sustainability. He spent the last 10 years pursuing various agricultural and horticultural interests throughout Virginia, including a ivestock farm and a vineyard. He has a B.A. in anthropology with minors in environmental studies and Italian from James Madison University

VCU Sustainability strives to build a better, more sustainable future through education, innovation, collaboration and engagement. By addressing the needs of students, faculty, staff and community, VCU hopes to promote positive behavioral change, responsible campus practices, and forward-looking policies.

LITERATURE CITED

Hoffman, J. S., Shandas, V., & Pendleton, N. (2020). The effects of historical housing policies on resident exposure to Intra-Urban Heat: A study of 108 US urban areas. Climate, 8(1), 12. https://doi.org/10.3390/cli8010012.

J. Eric Davis, Jr., Catherine McRae, Bret L. Estep, Barden, L. S., & Matthews, J. F. (2002). Vascular Flora of Piedmont Prairies: Evidence from Several Prairie Remnants. Castanea, 67(1), 1–12. http://www.jstor.org/stable/4034311.

Kane, P. (2018, November 2). Taking root: Project to plant trees connects VCU and Carver. VCU News. https://news.vcu.edu/article/Taking_root_Project_to_plant_trees_connects_VCU_and_Carver.

Plumer, B., Popovich, N., & Palmer, B. (2020, August 24). How decades of racist housing policy left neighborhoods sweltering. The New York Times. https://www.nytimes.com/interactive/2020/08/24/climate/.racism-redlining-cities-global-warming.html.

Shandas, V., Voelkel, J., Williams, J., & Hoffman, J. (2019). Integrating satellite and ground measurements for predicting locations of extreme urban heat. Climate, 7(1), 5. https://doi.org/10.3390/cli7010005.

Explore natural communities with Flora App update

From Your Natural Heritage Program

By Joey Thompson
Ecologist

Last year, a major upgrade came to the Flora of Virginia App when the Flora of Virginia Project teamed up with the Virginia Natural Heritage Program to incorporate Ecological Community information. With this update, you can now explore Ecological Classifications of Virginia through the app. Learn about Natural Communities by visiting new pages for more than 80 ecological groups in Virginia with general info, range maps, more than 1,000 captioned photographs, species lists, lists of community types and associated conservation status/rarity ranking.

For decades, ecologists at the Department of Conservation and Recreation's (DCR) Natural Heritage Program have been conducting field work including rigorous vegetation plot sampling to classify the variety of plant communities across the commonwealth. From the mountain ridgetops to the marshes and dunes that protect our shorelines, ecologists have been hard at work interpreting the different types of communities that exist. The purpose is not only to better understand plant communities and be able to communicate about them, but especially to determine their conservation status, rarity, and priority for protection.

What is a natural community? A natural community, or ecological community, according to DCR is "an assemblage of co-existing, interacting species, considered together with the physical environment and associated ecological processes, that usually recurs on the landscape." Drought-adapted plants growing together on a south-facing cliff make up a natural community, as do spruce forests at Virginia's highest elevations and Bald Cypress towering over lily pads in blackwater swamps. Even the composition of weeds that occurs along sidewalk and parking lot cracks in a city could be considered a natural community, although you won't find that in the app; the classification presented by DCR is restricted to communities that occur independent of modern human alteration.

To better understand the wide variety of natural communities, they have been organized in a hierarchical classification, analogous to phylogenetic classification. At the top of the Ecological Classification is the System, followed by the Ecological Class, then the Ecological Community Group, and at the finest level is Community Type. "Community Type" is analogous to "species" in phylogenetic classification. Across the commonwealth, a staggering 300 plus different community types have been observed and classified. Currently, detailed information and range maps are offered at the Ecological Community Group level. Some groups have numerous types classified under them. For example, the Central Appalachian Shale Barrens Group has six community types described within it. Therefore, the range map provided on the Shale Barrens Group page indicates a composite range of all six types within the group. Dots on the range map indicate locations of known examples of community types within the group, documented either as a significant occurrence by DCR, or sampled by a DCR vegetation plot, or both. Community types can be found on the FOVA App listed at the bottom of group description pages. Want to see what all these different types look like? You are in luck, photos in the app are labeled by community type!

What does one do with all this information? Understanding the relationship and difference between natural communities can be hard. Identifying natural communities in the field can be even harder. This information is not meant to be a one-stop field guide to the natural communities of Virginia. Rather, the new upgrade is meant to be an introduction to ecological classification as well as the diversity and conservation status of communities across Virginia.

Don't be frustrated if you are not able to go outside and fit your surroundings into one of the community groups. For starters, one must be confident in plant identification skills and knowledge of plant ecology to use the ecological classification in the field. From trees to grasses and sedges, some species may be excellent indicators of a habitat or community while others are generalist species that occur in a wide variety of habitats (and thus not helpful in narrowing down community type). Knowing the habitat preferences and ecological tolerance of plants is especially important.

If you are looking for communities to explore and identify, head to your nearest state park, national park, or other natural area. Spend some time walking around and noting the difference in assemblages of plant species associated with different areas and landforms. Make a list of all the species you see and make a note about which ones are "dominant" or consistently occurring with relatively high cover. Take into account your geographic location, the geologic and soil substrates associated with your area, and the local prevailing natural forces such as soil moisture, elevation, slope, slope aspect, soil saturation, temporary flooding, drought or the lack thereof. Review the species you

(See Flora App, page 7)

Ambassador Program helps spread the word about Flora App

With nearly 83 percent of land under private ownership, getting the Flora App into the hands of more landowners will help conserve native plants and restore natural ecosystems.

The Flora of Virginia Project (https://floraofvirginia.org) is a not-for-profit organization established in 2001 with a mission to publish the first *Flora of Virginia* since the 18th century. Botany is an ever-evolving science, so after the *Flora* was published in 2012, the volunteer board set out to publish the Flora App in 2017. Now, the Flora of Virginia Project seeks to improve data integrity, implement functionality that makes the App easier to use, and develop and offer educational programming. VNPS has been a major supporter of the Flora of Virginia Project and most members are well-aware of the impact the Flora App has had on our collective work. The ability to source botanical data from anywhere on your phone is groundbreaking for environmental and botanical professionals making decisions and discoveries in the field. However, the true power of the Flora App rests in our ability to get it into the hands of enthusiasts and private landowners. According to U.S. Bureau of the Census, Statistical Abstract of the United States, 82.9% of Virginia real property is privately held. Thus, efforts to project Virginia's native landscapes and flora must include private citizens.

The *Flora of Virginia* and the app are botanical references. Understanding the need to expand the use to a broader audience, work began in 2021 to make it easier to use for non-scientists with the inclusion of an embedded, hyperlinked glossary. The launch of the Ambassador Program this year continues the work to appreciate and protect native flora. The program involves training experienced Flora App users, like many VNPS members, to become power users capable of introducing and teaching people how to use the Flora App in property management decisions. Even the smallest landowner making simple landscaping decisions to plant natives helps protect and restore Virginia's native plants and landscapes.

VNPS and Flora of Virginia board member Ashley Moulton gets down in the dirt at the Lewis Ginter Botanical Garden. (Ann Regn photo)

The Flora partnered with Virginia Master Naturalists to offer a "How to Use the Flora App" webinar. From there, interested attendees completed and reviewed homework, and are currently joining Flora board members in field labs to experience a flora walk developed by trained educators. Now, with the help of board members, they are working to host programs to help "spread the word." Once completed, they will be recognized as Flora Ambassadors. Our budding Ambassadors have suggested ways to make the app more accessible and easier to use for non-scientists. Many suggestions will be included in the next update later this summer.

The response has been so positive that we are working on plans to host the program again in 2025. Discussions are underway to partner with VNPS and Virginia Master Gardeners. If you are interested in learning more, visit https://floraofvirginia.org/education/ambassador-program/ and join our mailing list. Our website also includes ways to follow The Flora on social media and subscribe to *Florascope*, our bi-monthly newsletter.

Finally, we have a number of projects in the queue in addition to continuing the Ambassador Program, including upgrading our database infrastructure and reprinting *Flora of Virginia.* We can't do any of this work without our donors, so please consider giving at https://floraofvirginia.org/support/donate/.

--Jenny Norwood, Executive Director, Foundation of the Flora of Virginia Project

Flora App

(Continued from page 6)

see in the Flora App and pay specific attention to the "Habitat and Status" category. Some may be linked directly to a Natural Community in the app.

Consider the habitats of all the plants you record and determine commonalities. Then, explore the Natural Community part of the app. Explore the Classification in three different ways. The Visual Guide's photos are excellent for learning about Classification. The Hierarchical View is great for quickly navigating classification, and List View allows searching by species or terminology (try searches such as bald cypress, spruce, white oak forest, marsh, woodland, barren, boulder field, mountain, piedmont, coastal plain, etc.). Don't be discouraged if it doesn't make sense at first. The ecological classification breaks down an unbelievably complex biosphere into a relatively simple hierarchy, therefore there is room for error, learning, and improvement. Anyone can now explore the Virginia Ecological Classification. With diligence and patience, you can apply it and learn a great deal about the world around you.❖

Three amazing projects receive VNPS funding

Once again, the Society received a number of well written, engaging, grant proposals for 2024. We received seven proposals requesting over $65,624. Five reviewers carefully read and scored each proposal on its merits and projected contribution to Virginia's native flora as well as the research design and involvement of other researchers including undergraduate and graduate students. All proposals were worthy of funding, but VNPS funds do not allow all to be funded.

Three proposals stood out and met all our criteria for the proposed research to be a valuable contribution to the understanding of Virginia's flora.

- A $14,750 award was given jointly to Devin Floyd for the Center for Urban Habitats and Dr. Mary Jane Epps of Mary Baldwin University for "An Assessment of the Grasslands in Eight Counties of the South-Central Virginia Piedmont."
- A second award for $6,098 was given jointly to Dr. Andrea Weeks and Emily Poindexter of George Mason University for "Conservation Genetic Analysis of Ozark Milkvetch (*Astragalus distortus*; Fabaceae), a Critically Imperiled Virginia Native Plant."
- A third award for $5,390 was given to Dr. Harvey Ballard of Ohio University for "A Taxonomic Treatment of the Violets (Violaceae) of Virginia and North Carolina."

Harvey Ballard of Ohio University

Mary Jane Epps and Devin Floyd stand in a remnant grassland.

Devin Floyd and Mary Jane Epps received funding last year for their continuing work on the flora of the native grasslands in Virginia's Piedmont. This Piedmont Grassland project has been ongoing for six years through funding from a variety of sources, including VNPS. Again this year, the VNPS Board voted to continue supporting this research in a region that is arguably the most lived-in ecological region of the Eastern U.S. The natural world of this region has been severely impacted by the millions of people inhabiting the region for hundreds of years. But pockets of unique and remarkable floral diversity have been found in the Piedmont and, according to Floyd and Epps, vegetative surveys have revealed that these native grasslands contain more species than other natural communities in the region. Surveys further an understanding of the quantity, distribution, and condition of these remnant communities so that all concerned will be better able to develop strategies for further research, conservation and protection of these remnant habitats and rare or uncommon species assemblages.

The current study will focus on the counties of Amherst, Appomattox, Campbell, Fauquier, Halifax, Lunenburg, Mecklenburg, and Nottoway. The project staff will conduct a cursory inventory of potential high-quality survey sites using a combined method of driving backroads for field reconnaissance while scrutinizing aerial photography, geologic maps, historic maps, and LIDAR. Identified sites will then be surveyed intensively following the methodology (Relevé Method) of our Virginia Division of Natural Heritage. Their goal is to identify a minimum of 50 high-quality grassland sites within the eight-county region. The long-term goal is to work toward protection of such sites before all are lost. "But we must know what we have before more, or all, are lost," they noted in their application.

The second project award helps fund the master's thesis research of Emily Poindexter with advisor Dr. Andrea Weeks. The Ozark Milkvetch (*Astragalus distortus*), a member of the Legume family, is found only in bright sunlit Shale Barrens communities. It is reported from nine southern mid-west states and as a disjunct in Virginia, West Virginia, and Maryland. It is not found in the 'in-between' states of Indiana, Ohio, Kentucky, Tennessee, or Mississippi – a big gap. Data on

its current distribution in Virginia, West Virginia, and Maryland is lacking although it is known to be very rare. For example, West Virginia has historically recorded 11 occurrences in the state but in 2022, a survey found only one occurrence still present. In Virginia, it has not been reported since 1982 although Weeks located this species in Shenandoah County in May 2022. Previous persistent and diligent fieldwork by Weeks and Poindexter have found additional sites in Maryland and Virginia.

The research goals supported, in part, by this VNPS grant will continue the search for new populations and obtain leaf material for genetic analysis to assess the current taxonomic status of the disjunct populations of the Ozark Milkvetch while seeking understanding of the genetic diversity within and among the Mid-Atlantic populations. It should produce some interesting results for such rare and disjunct populations.

Dr. Harvey Ballard has spent over 45 years of his botanical career studying eastern North American violets (*Viola* spp.) with several publications to his name. His Viola taxonomic research includes extensive field exploration, herbarium studies, as well as raising violets in the lab with the broad focus of traditional systematics, phylogenetics, molecular ecology, population and conservation genetics. He also maintains an interesting Viola website - "Violets of the Great Plains and Eastern North America" (https://people.ohio.edu/ballardh/vgpena/). Virginia and North Carolina individually possess great taxonomic diversity in vascular plants that is echoed in violet diversity, with each of the two states exhibiting the greatest violet diversity in eastern North America. Although the taxa vary between the states, there appears to be 57 different taxa in the two states with 14 taxa considered rare (found in five counties or fewer). Just last year, Ballard (with J. L. Hastings) described a new species from the Blue Ridge near Wintergreen, and they named it the Blue Ridge Violet, *Viola monacanora*. The species name "honors the hardy peoples of the Monacan First Nation who have lived for millennia around the northern portion of the Blue Ridge Mountain range where this violet was first discovered."

VNPS funding will help support Ballard's broader two-year research project focusing on herbarium, field and laboratory studies with the objective to comprehensively characterize violet diversity in Virginia and North Carolina. His ultimate goal is the production of a full taxonomic treatment of violets in the two-state region. Ballard and some students are spending this summer traveling throughout Virginia and North Carolina visiting herbaria to collect data. Based on these studies, next summer will be spent on fieldwork throughout the region.

Smooth Coneflower, a rare and threatened grassland remnant.

Emily Poindexter studying herbarium specimens.

VNPS is proud to help fund the research of these dedicated botanists in their goal of increasing the knowledge of our Commonwealth's flora. VNPS began this grant program in 2015, with a goal to "advance our understanding of the biology of native plants and their relationship to their ecosystems; teach students about the importance of native plants and habitat preservation; measure the benefits of native plant habitats to the economic and environmental health of the Commonwealth; or address similar topics."

VNPS has awarded well over $100,000 to principal investigators and students from a variety of academic institutions and non-profit organizations. Information about the research grant program can be found under "Resources" on the VNPS website at https://vnps.org/research-grant-program/ or by emailing grantmanager@vnps.org.

Proposals for 2025 funding will be accepted from December 1, 2024, to the deadline of February 1, 2025.

--Kevin Howe, First Vice President and Acting Grants Manager

Finding new plants in new places always fun

From the President
Nancy Vehrs

Happy summer, the season of family vacations! At the end of May, I had the pleasure of accompanying a longtime friend to the southwestern corner of Colorado and southeastern Utah to visit three national parks in just six days. We began our journey by flying into Grand Junction, renting a car, and heading to the mountains and the nearly deserted Powderhorn Mountain (Ski) Resort where we spent a night. As we climbed in elevation, cool air refreshed us, and conifers and mountain lakes provided stunning scenery along the Grand Mesa Scenic Byway. Surprisingly, instead of wildflowers, there was quite a bit of snow in those high elevations. The forest roads were gated and closed. We tried to take a short hike in an area near a lake, but the trail with patches of snow became more snow-covered, and my friend turned back because she wasn't wearing proper footwear. I trudged on, only to fall into knee deep slushy snow from which I had some difficulty extricating myself. Age isn't kind to the joints.

Wildlife was abundant with sightings of black bear, mule deer, yellow-bellied marmots, chipmunks, and western birds such as Stellar's Jays. As we headed toward Montrose and the Black Canyon of the Gunnison National Park, wildflowers appeared. I had never heard of this park and, apparently, it had been a national monument until 1999. What a delightfully underutilized national park! It was uncrowded, had gorgeous vistas, and supported loads of wildflowers. My favorites were Larkspurs and Lupines, Phlox, Desert Paintbrush, Arrowleaf Balsamroot, and so much more. It's truly amazing how many plants such dry climates can support.

As we headed to Mesa Verde National Park along the San Juan Skyway, we enjoyed spectacular views of snow-topped mountains in the Uncomprahgre National Forest. Once in the park, we could see miles of arid landscape. While this park is mainly an archaeological wonder with its preserved cliff dwellings of the Ancestral Pueblo people, we saw plenty of vegetation along the Spruce Canyon Trail. Hiking even short distances of two and a half miles can be very challenging on hot, dry, high elevation trails. Scarlet Gilia, Yucca, Mountain Mahogany, Utah Serviceberry, and Skunkbush were some of the plants along the trail.

Our trip ended with a visit to the famed Arches National Park in Utah where timed admissions were required. As we had a couple of hours to kill before entering the park, we spent some time along the Colorado River in the red rock gateway city of Moab. It was a Saturday, and people were enjoying the bicycle paths and the water – boating, fishing, and tubing. Once we entered Arches, we used our time to see as much as we could, both on foot and by car. This park, with its striking rock formations, lies atop an underground salt bed across the Colorado Plateau created 300 million years ago when a sea flowed in the region and eventually evaporated. Vegetation is gnarled and shrubby with Pinyon and Juniper. The rock formations created welcome shadows for shade as the hot day depleted our energy. Although the entire trip was too short, I was happy to return home to our beautiful lush green Commonwealth.

An ancient, gnarled conifer at Arches NP. (Nancy Vehrs photos)

In my last column in the Spring issue of *Sempervirens*, I painted a too-rosy picture of our conservation successes in the Virginia General Assembly. Elsewhere in this issue, Conservation Chair Barbara Ryan sets the record straight. I also announced our annual meeting at Massanetta Springs in Harrisonburg scheduled for Sept. 20-22. Watch for an email once registration begins. ❖

Desert Paintbrush, Larkspur, and Scarlet Gilia all seen in Black Canyon of the Gunnison National Park.

'24 General Assembly recap on native and invasive plant species

What began on an optimistic note at the beginning of this year's Virginia General Assembly ended with some disappointments, but not all was lost. This was a historic year due to unprecedented legislator turnover and the introduction of over 3,000 bills.

From January through March, VNPS worked closely with the Virginia Conservation Network (VCN) and our partner organizations to advocate for policies to promote native plants and address invasive plant species. Barbara Ryan, VNPS Conservation Chair, represented VNPS at semi-weekly VCN Legislative Committee meetings, and Tom Smith, VNPS's unpaid registered lobbyist, was on the ground in Richmond throughout the session, visiting with legislators, attending hearings, and providing testimony. VNPS's devoted members provided needed support via visits to General Assembly members and committees and testimony, emails and phone calls to legislators on many of our legislative initiatives. Many legislators were helpful on our conservation issues this session with special thanks to Delegates David Bulova, Paul Krizek, Mark Sickles, Holly Seibold and Senators Creigh Deeds and Saddam Azlan Salim.

Most of the bills VNPS supported were passed by the Virginia House and Senate. Unfortunately, three were then vetoed by the governor, who did not sign a total of 153 of the bills that had been approved by both chambers this year. One bright spot was the outcome of extended budget discussions. Here's a recap of the initiatives VNPS closely followed.

Supporting SB306, HB47, and HB528 - Native and Invasive Plant Species

VNPS actively supported two bills that would have informed consumers about the sale of invasive plants at nurseries by requiring signage identifying the plants as invasive. The bills were sponsored by Senator Salim **(SB306)** and Delegate Krizek **(HB47)**, and VNPS was the VCN lead organization for both of these bills. The bills differed in some ways, including where the signage would be placed. Both bills were approved by their respective chambers, and then reconciled into one bill in conference. That bill was approved by the full House and Senate, but then later vetoed by the governor.

VNPS also supported a bill introduced by Delegate Krizek that would have authorized any Virginia locality to adopt an ordinance prohibiting the sale of English ivy, with violations punishable by a civil penalty (**HB1167**). This bill was approved by both chambers, only to be later vetoed by the governor.

Another bill sponsored by Delegate Krizek would have prevented homeowner associations from prohibiting homeowners from establishing managed conservation landscaping using native plants. This bill was withdrawn at an early stage of the General Assembly due to concerns about proposed bill language. A Housing Commission workgroup is expected to convene this summer to further discuss the bill language, and it is hoped to be reintroduced next year.

Opposing SB299 – Cave Board

VNPS formally opposed SB299, introduced by Senator Timmy French, which would have repealed the Cave Board by transferring its responsibilities to the Board of Conservation and Recreation. This bill would have resulted in a significant loss of expertise and services to private and public landowners and conservation of Virginia's 4000+ caves and habitats supplying critical water supplies and harboring some of Virginia's richest above and below ground biodiversity. The bill was stricken early in the session as a result of these concerns.

Opposing SB517 - Honeybees

VNPS also joined with our partner organizations to formally oppose HB517, which designates the European Honeybee as Virginia's Official Pollinator. There were many reasons to oppose this bill, including the fact that European Honeybees are not native to Virginia and are poor pollinators of our native plants compared to native bees that are critical to the pollination and survival of our native species. The bill had the support of the agricultural and bee-keeping trades, though, and was passed by both the House and Senate and signed into law by the governor.

Budget Amendments

On the bright side, following extensive budget deliberations, legislators allocated funding across several state agencies to address invasive species in accordance with Virginia's Invasive Species Management Plan, along with new funding for the Natural Heritage Program and elimination of troublesome natural area preserve acquisition language. VNPS provided strong support for this additional funding through efforts on the ground in Richmond. Additional funding secured this year includes:

- $250,000 each year from the general fund and two positions at the Department of Conservation & Recreation;
- $485,000 the first year and $485,000 the second year and one staff position for the Department of Agriculture and Consumer Services;
- $940,000 the first year and $940,000 the second year and two staff positions to the Department of Forestry; and
- $775,000 the first year and $775,000 the second year and two staff positions were authorized from the Game Protection Fund for the Department of Wildlife Resources. Unfortunately this is authorization for existing DWR funds, not new funding;
- Appropriation of existing funding in the amount of $18.3 million in the first year and $16.1 million in the second year for the acquisition of land for natural area preserves; and
- $593,000 from the general fund and five staff positions for the Natural Heritage Program.

(See General Assembly, page 12

General Assembly

(Continued from page 11)

- In addition, this year VNPS successfully worked to have language removed from the budget that required DCR to have any addition to an existing preserve or a new natural area preserve be named in the budget, before DCR could start working on the acquisition. This language has been costly in terms of losing critical lands and funds because of the bureaucracy of getting new names into the budget, so its removal was a big win for our natural area preserve system.

Other Legislation of Interest

One invasive control-related bill that passed into law is HB320, which provides that unpaid volunteers may apply pesticides and herbicides to control invasive plants or noxious weeds, if they are under the direct supervision of a certified applicator. VNPS did not take a position on this bill, but its passage will be important to our state-wide efforts to control invasive plant species.

The year 2024 also was a banner year for legislation to preserve Virginia's tree canopy. VNPS closely follows tree-related legislative developments as our native trees provide habitat for wildlife, absorb polluted runoff, improve air quality, provide shade and heat-relief in summer, offer economic benefits, and benefit human health and wellbeing. Following years of advocacy, several tree preservation bills were passed by both chambers of the General Assembly this year, only to be vetoed by the governor. These include HB1100, which would have allowed any Virginia locality to adopt tree conservation ordinances, and HB529, which would have allowed localities to establish higher tree canopy replacement percentages.

Tree preservation bills signed into law this year include HB309 that directs the Department of Forestry to study reasons for tree canopy loss and identify opportunities to further tree preservation, and HB459 that provides localities in District 8 with new tools to encourage builders to conserve mature trees, rather than clear-cutting lots.

Following a bit of rest, VNPS will continue to closely track legislative developments in preparation for the 2025 General Assembly. Efforts are already underway to coordinate the efforts of the many partners involved in initiatives to address invasive plant species. While some of this year's outcomes are disappointing, we are now better prepared to pursue these initiatives! ❖

--Barbara Ryan, VNPS Conservation Chair

Sempervirens (ISSN 1085-9632) is the quarterly newsletter of the Virginia Native Plant Society, Blandy Experimental Farm, 400 Blandy Farm Lane, Unit 2, Boyce, Va. 22620, 540-837-1600, info@vnps.org. Nancy Vehrs, President; Nancy Sorrells, Editor; Karen York, Office Manager. Original material in *Sempervirens* may be reprinted if credit is given to the Virginia Native Plant Society, to *Sempervirens*, and to the author of the material, if named. Readers are invited to send letters, news items, and queries for consideration. E-mail items to Nancy Sorrells at lotswife@comcast.net.

Next submission deadline:
July 30, 2024

Printed on recycled paper

Please note the expiration date on your mailing label and renew accordingly.

VIRGINIA NATIVE PLANT SOCIETY

Virginia Native Plant Society
Blandy Experimental Farm
400 Blandy Farm Lane, Unit 2
Boyce, VA 22620
www.vnps.org

Non-Profit Org
US Postage
PAID
Staunton, VA
Permit No. 80